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AIRLIFT CLEARANCE ANALYZER,(U)
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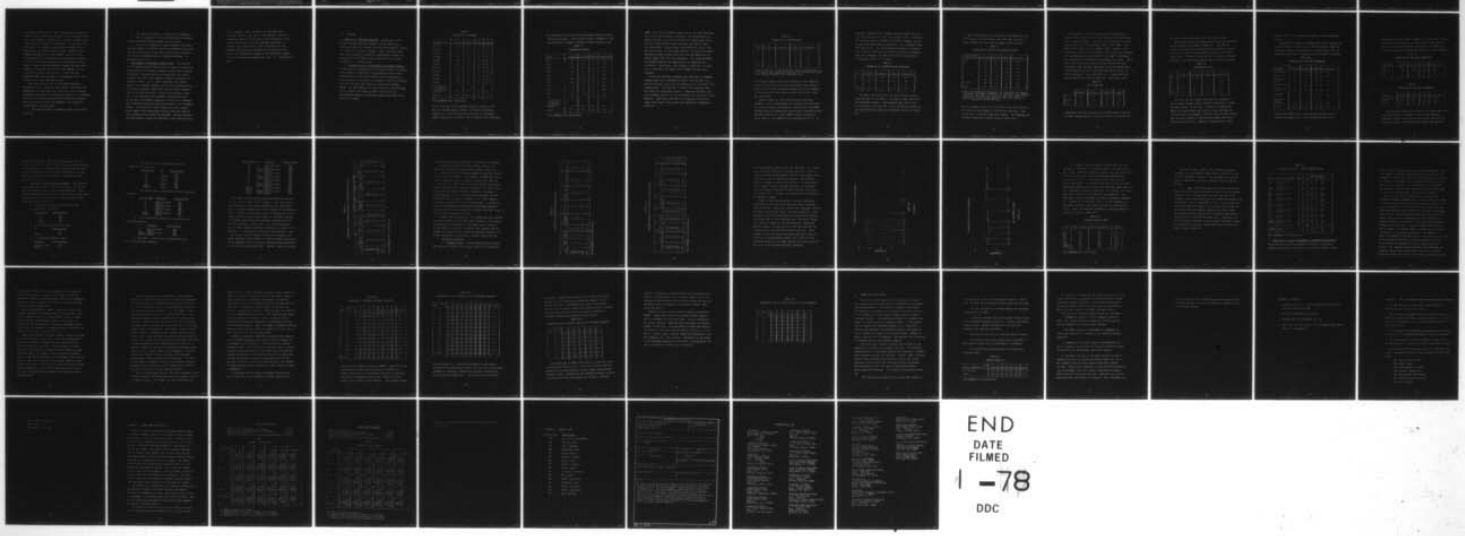

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AIRLIFT CLEARANCE ANALYZER

OPERATIONS ANALYSIS DEPARTMENT

NAVY FLEET MATERIAL SUPPORT OFFICE
Mechanicsburg, Pennsylvania 17055

Report 131

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AIRLIFT CLEARANCE ANALYZER

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REPORT 131

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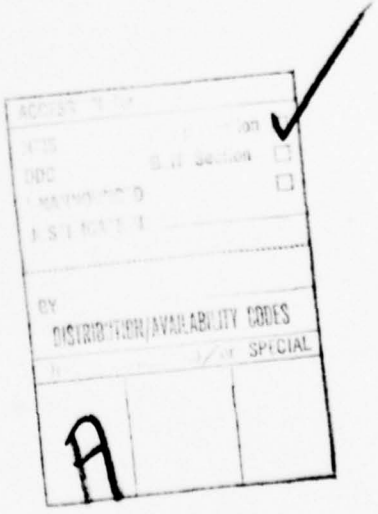
ABSTRACT

To conserve SDT (Second Destination Transportation) funds, NAVSUP (Naval Supply Systems Command) established new challenge parameter values for CONUS (Continental United States) outbound cargo scheduled for lift by MAC (Military Airlift Command). The modification of the challenge parameters changed the monthly material flow and movement costs. This report documents a quantitative model, the Airlift Clearance Analyzer, which compares the tradeoffs in material flow and movement costs resulting from changes to the airlift challenge parameter values.

Tables were constructed to show the monthly percentages of shipments airlifted and costs of airlifted shipments. These tables provide a quantitative basis for projecting monthly number and cost of air shipments resulting from feasible parameter settings. The tables may be validated at any time through additional runs of the Airlift Clearance Analyzer.



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EXECUTIVE SUMMARY

1. Background: To conserve SDT funds, NAVSUPINST 4630.22A (reference 1) intensified the challenge of air cargo scheduled for lift by MAC. Previously CONUS outbound cargo scheduled for MAC channel airlift was challenged if either the shipment weight exceeded 1,000 pounds or the requisition was more than 180 days old. The current instruction reduces the weight parameter to 500 pounds, the days old parameter to 90 days, and introduces a volume constraint of 40 cubic feet.

The modification of challenge parameters changes the material flow and movement costs. However, the relationship between material movement and the challenge parameters has not been quantified. This report documents a quantitative model which compares the tradeoffs in material flow and movement costs resulting from changes to the airlift challenge parameters.

2. Objective: To design a quantitative model capable of forecasting economic and operational effects of parameter modification upon airlift clearance processing.

3. Model Description: The Airlift Clearance Analyzer automatically categorizes airlift requests which are exempt from challenge as air shipments. The analyzer computes the

number, cumulative weight and cost for exempt air shipments along with the surface cost for the remaining nonexempt requests.

The nonexempt airlift requests are subjected to a range of feasible challenge parameter values. For each combination of parameter values, the analyzer projects the number, cumulative weight and cost of air shipments and the surface cost for remaining shipments. The total air shipments under any parameter mix includes both requests which are less than the challenge parameters and requests which, although larger than the parameter values, are expected to override the challenge.

4. Approach: The accuracy of the Airlift Clearance Analyzer depends on the ability to forecast air shipment overrides. Therefore, challenged shipments were analyzed to determine if the information on the request could be used to predict which requests would override a challenge.

Sample airlift requests in conjunction with forecasted override rates were processed through the Airlift Clearance Analyzer. Tables were constructed to display the monthly numbers of shipments airlifted and costs of airlifted shipments for a reasonable range of parameter values.

5. Conclusions: The best method of forecasting overrides employs two attributes of the challenged airlift request: the age of the requisition and the APOD (Air Port of Debarkation).

The forecasted override rate varies significantly among those APODs with a large number of challenges, but does not vary significantly from month to month.

Analysis of the constructed tables revealed significant differences in monthly projections of the material flow (number and weight) and cost of air shipments for given challenge parameter values. However, the relative differences for any two sets of parameter values appeared to remain constant from month to month. These two conclusions are valid for airlift requests coded as SDT, as well as for all airlift requests. In addition, the number and cost of nonexempt air shipments are relatively insensitive to changes in the standard parameter values.

The tables in this study provide a quantitative basis for projecting monthly number and cost of air shipments resulting from feasible parameter settings. Moreover, the tables may be validated at any time through additional runs of the Airlift Clearance Analyzer. Thus, management now has the proper tools for projecting and monitoring the most important parameters in the cost-effective operation of the air clearance process.

I. INTRODUCTION

Reference 1 establishes policy on the use of air transportation for Navy cargo. To conserve SDT funds, the instruction intensifies the challenging of air cargo scheduled for lift by MAC. Previously CONUS outbound shipments for MAC channel airlift were challenged if the shipment weighed more than 1,000 pounds or was older than 180 days. Besides reducing the weight parameter to 500 pounds, the current instruction requires the challenge of shipments with a volume exceeding 40 cubic feet or a requisition date older than 90 days.

Shippers of CONUS outbound Navy material eligible for airlift by MAC submit TCMD (Transportation Control and Movement Document) data to NAVMTO (Navy Material Transportation Office). Air shipment requests which include justification for airlift (prevalidated) or meet the challenge exemption criteria described in APPENDIX B (automatic) are exempt from challenge and sent by air. The remaining air shipment requests labeled nonexempt are subjected to the challenge procedure described below. If the shipment's weight, volume, and requisition date are less than the challenge parameters, then the shipment is sent by air. When the shipment request exceeds any of the challenge parameters, the requisitioner

is either called or sent a challenge document which cites the savings realized if the shipment is diverted to surface transportation. If a response is not received by NAVMTO within five days, the shipment is diverted to surface movement. However, if the requisitioner justifies the necessity of air shipment within five days, the shipment overrides the challenge and goes by air.

The modification of the challenge parameter values changes the flow and cost of material movement. However, the cause and effect relationship has not been quantified. As requested by reference 2, the Airlift Clearance Analyzer quantifies the operational and economic effects of parameter modification upon airlift clearance processing for airlift requests received by NAVMTO. However, the reason that parameter values were changed in the past was due to a shortage of SDT funds as described in reference 1. Therefore, a logical extension of the project effort was to analyze the economic effects of parameter modification on airlift requests which affect SDT funds only. Thus, the Airlift Clearance Analyzer was modified to process only airlift requests with TACs (Transportation Account Code) defined by reference 3 as SDT; i.e., N001 through N599. The analyzer may be modified as required to process any specific group of airlift requests, as well as all of them.

II. TECHNICAL APPROACH

A. INPUT DATA. The NATDS (Navy Automated Transportation Data System) Air Clearance Master File was the source of two months data used in the analysis. The first extract of 30 days corresponds to the month of April, 1977 (Julian dates 77091 through 77120 inclusive). The second extract of 30 days corresponds to the month of May, 1977 (Julian dates 77126 through 77155 inclusive). The Air Clearance Master File contains all air shipment requests which were diverted to surface, went by air, or were in the challenge state (the five day interval allowed after the challenge for the requisitioner to respond) for the given time intervals. Air shipments split by MAC into more than one shipment (an alpha in the last position of the TCN (Transportation Control Number)) were ignored and only the original unsplit shipment request as received by NAVMTO was considered. The total number of airlift requests considered was 13,952 for April and 12,698 for May.

B. DEVELOPMENT OF AIRLIFT CLEARANCE ANALYZER. The Airlift Clearance Model is a computer representation of the procedures shown in FIGURE I. The sample data are introduced into the model for analysis. The first operation of the model is to count the number of shipments which have been prevalidated

CURRENT CHALLENGE PROCEDURE

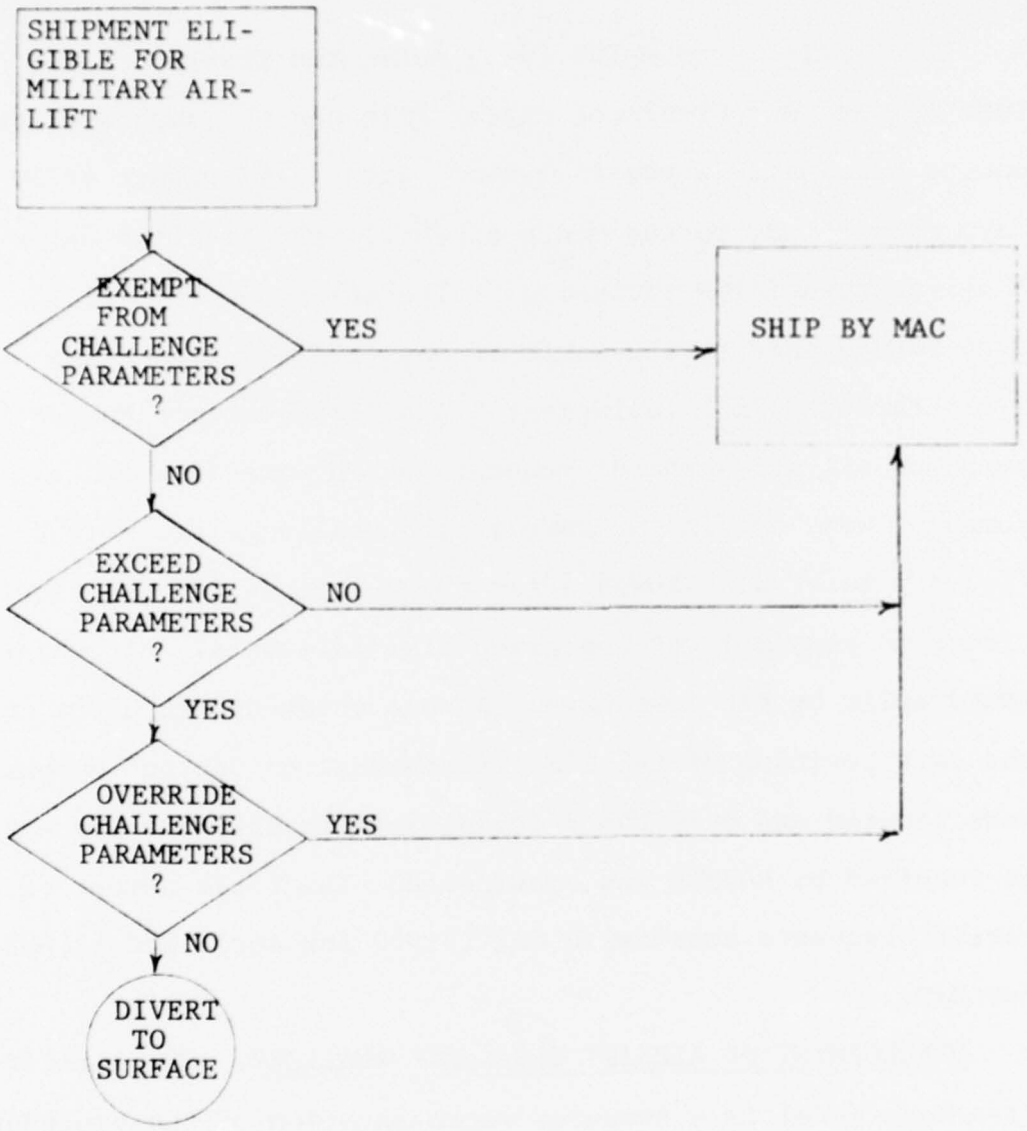

FIGURE I

or are considered automatic and to determine their cumulative weight and air shipment cost. Air shipment requests in prevalidated or automatic status (about 25%) are always exempt from challenge and are shipped by MAC airlift. Shipments failing this initial test are priced out at surface shipping rates. The surface cost plus the air cost provides a minimum total transportation cost for comparison of alternative parameter values.

Shipments which are neither prevalidated nor automatic (nonexempt from challenge) are then compared to the challenge parameters. When the shipment's weight, volume and requisition age do not exceed the challenge parameters, the shipment is sent by MAC airlift. If the shipment's weight, volume or requisition age exceed the challenge parameter, the requisitioner must justify that air shipment is necessary. In the past the percentage of challenged shipments which ultimately went by air was approximately 50%. The model assumes all shipments which are smaller than any given challenge parameters go by air along with certain shipments which are expected to override the challenge. (Forecasting which shipments override the challenge is discussed below under the development of challenge override rates.)

Currently, the cost of air transportation is based on the larger of the item weight or 12.5 times the cubic volume as

prescribed by reference 4. Thus, items light in weight but large in cubic volume may cost more to ship than small heavy items. For example, a hypothetical item has a volume of 10 cubic feet and a weight of five pounds. If cube were not a cost factor, the shipping charges would be based on five pounds times the channel rate per pound. However, since shipping charges also consider volume, the cost of air transportation for the hypothetical item would be based on 125 (12.5 x 10) pounds and not the actual weight of five pounds. Because the two parameters, weight and cube, work together to determine the cost per item shipped, the two variables are here treated as one -- called ASW (air shipment weight) and set equal to the maximum of the item's weight or 12.5 times the cubic volume.

Since there are now only two challenge parameters -- ASW and days old, a matrix or table can be constructed (see APPENDIX C) for items which are subjected to the challenge parameters (excluding prevalidated and automatic air shipments). Any cell of the matrix contains the following four numbers based on the ASW and days old parameters corresponding to the particular row and column:

1. The expected number of shipment requests which will go by air.

2. The cumulative ASW for the expected air shipments.

3. The air shipment cost for the expected air shipments (based on the ASW and the channel rate per pound).

4. The cost of shipping all other shipments by surface.

The above numbers reflect not only those shipments whose ASW and days old values are less than the challenge parameters, but also those shipments which, although challenged, are expected to go by air.

C. DEVELOPMENT OF CHALLENGE OVERRIDE RATES. Construction of the tables described above requires a means of forecasting which particular challenged shipments override the challenge. A simplistic approach would be to assume that the current override rate (about 49%) remained constant irrespective of parameter values. Yet it seems reasonable that certain types of air shipment requests override the challenge and go by air more frequently than others and that these shipments could be further identified. During the preliminary analysis, it was discovered that shipments challenged because of the days old parameter appeared to override the challenge more frequently than those challenged because of air shipment weight. Verification of these findings on larger samples would suggest that forecasting overrides should be based on that parameter which caused the challenge. Besides considering the parameter causing the challenge, other characteristics

such as channel, APOD, consignee, TP (Transportation Priority), project code, TAC, or DIC (Document Identifier Code) were analyzed to determine if any correlation exists between these factors and the challenge overrides. In addition, any characteristic which correlated with the shipment overriding the challenge was evaluated to determine if the relationship changed as the parameters changed or if the relationship changed over time; i.e., from month-to-month.

III. FINDINGS

A. ANALYSIS OF CHALLENGE OVERRIDES. During April, 1977, NAVMTO received 1,942 air shipment requests which were challenged under the standard criteria and ultimately resolved by either air or surface shipment. These challenged shipments were analyzed to determine relationships between the information on the TCMD and the probability of challenge override; i.e., override rate.

1. Characteristics of Challenged Air Shipment Requests. The MAC system is characterized by shipping routes or channels. A MAC channel is defined by two geographical points (each identified by a three letter channel code) between which airlift service is provided. For example, Travis AFB (channel code SUU) and Cubi Point (CUA) are connected by channel SUUCUA. The MAC channels with more than 2% of the challenged airlift requests are shown in TABLE I along with the corresponding number of challenged requests and number which went by air anyway.

TABLE I

COMPARISON OF CHANNELS

CHANNEL CODE*	# CHALLENGED	% CHALLENGED	# OVERRIDE	% OVERRIDE
SUUCUA	254	13.1	77	30.3
NGURTA	247	12.7	137	55.5
SUUHIK	220	11.3	57	25.9
SUUUAM	179	9.2	105	58.7
NGUNAP	174	9.0	95	54.6
TCMOKO	160	8.2	76	47.5
DOVPIK	156	8.0	135	86.5
NGUSIZ	79	4.1	54	68.4
SBDDNA	44	2.3	16	36.4
NGUGAO	44	2.3	18	40.9
NGUKEF	44	2.3	16	36.4
45 others each less than 2% of challenged requests	341	17.5	172	50.4
Totals	1,942	100.0	958	49.3

*See APPENDIX D for definitions

About 13% of the 1,942 challenged airlift requests or 254 were for the MAC channel SUUCUA. Of the 254 challenged requests, 77 or 30.3% (override rate) went by air anyway. TABLE I shows that 11 (20%) of the 56 channels with challenges

are responsible for 82.5% of all challenges and 81.9% of all challenge overrides. Since several channels terminate at the same destination, TABLE II displays similar statistics for

TABLE II

COMPARISON OF APOD

APOD*	# CHALLENGED	% CHALLENGED	# OVERRIDE	OVERRIDE RATE
CUA	254	13.1	77	30.3
RTA	247	12.7	137	55.5
HIK	220	11.3	57	25.9
UAM	203	10.4	118	58.1
OKO	195	10.0	90	46.2
NAP	174	9.0	95	54.6
PIK	156	8.0	135	86.5
SIZ	79	4.1	54	68.4
DNA	50	2.6	19	38.0
KEF	45	2.3	17	37.8
GAO	44	2.3	18	40.9
34 others each less than 2% of challenged requests	275	14.2	141	51.3
Totals	1,942	100.0	958	49.3

*See APPENDIX D for definitions.

APODs. The top seven APODs account for 74.5% of all challenges and 73.9% of all challenge overrides. CUA and HIK have the lowest override rates of 30.3% and 25.9%, respectively; while PIK has a significantly higher override rate (86.5%) than the other APODs. Because these seven APODs have such a large and varied effect on challenged requests, the Airlift Clearance Analyzer provides separate statistics for the APODs with an impact larger than 5% of the challenges. The remaining APODs are grouped together and summarized in an eighth set of statistics. The analyzer also produces a ninth set of statistics to show the total impact on all CONUS outbound cargo shipments.

Of the 295 different consignees who submitted air shipment requests which were challenged in April, only two were responsible for more than 5% of the challenges (at 7.61% and 5.25%, respectively). Over 82% (243 of 295) of the consignees had less than five challenged requests. Comparing overrides with the consignee presents too few occurrences for sound statistical analysis. Considering only the first character of the consignee (the service code) yields the information displayed in TABLE III.

TABLE III

COMPARISON OF SERVICE CODES

SERVICE CODE*	# CHALLENGED	% CHALLENGED	# OVERRIDE	OVERRIDE RATE
N	983	50.6	404	41.1
R	397	20.4	156	39.3
V	536	27.6	382	71.3
Other	26	1.4	16	61.5
Totals	1,942	100.0	958	49.3

*Service Code 'R' is used by Pacific Fleet operating units; 'V' by Atlantic Fleet operating units and 'N' by activities other than CINCPAC/CINCLANT Fleet operating units.

Air shipment requests destined for Atlantic Fleet operating units are more likely to override challenges than other requests; 71% of these challenged shipments go by air compared to 39% for Pacific Fleet operating units and 41% for other Navy activities.

TABLE IV shows the relationship between challenged documents, their TP and whether the challenge was overridden. TP 1 airlift requests correspond to requisitions with UMMIPS (Uniform Material Movement and Issue Priority System) Priority Designators 01-03, TP 2 with UMMIPS Priority Designators 04-08, and TP 3 with UMMIPS Priority Designators 09-15. As

expected, challenged TP 1 requests are more likely to go by air (approximately 65%) than TP 2 requests (44%). Ordinarily, TP 3 requests are not eligible for airlift; however, airlift is authorized under certain conditions: (1) consignee accessable only by air, (2) item designated economic air eligible, or (3) airlift considered appropriate by traffic management. Thus, TP 3 shipments are few (less than 1%) yet go by air as authorized (100% of the time).

TABLE IV

COMPARISON OF TRANSPORTATION PRIORITIES

TP	# CHALLENGED	% CHALLENGED	# OVERRIDE	OVERRIDE RATE
1	440	22.7	287	65.2
2	1,487	76.5	656	44.1
3	15	.8	15	100.0
Totals	1,942	100.0	958	49.3

The April challenges were from 316 difference project codes and only two of these had an impact larger than 5% on the challenged requests. Approximately 85% (268 of 316) of the project codes had five or less challenges leaving too few observations per group for meaningful statistical analysis.

TABLE V discloses the distribution of challenges by the first character of the project code (the type activity or weapon system) for those with an impact larger than 5%.

TABLE V

COMPARISON OF TYPE ACTIVITY/WEAPON SYSTEM

TYPE ACTIVITY* OR WEAPON SYSTEM	# CHALLENGED	% CHALLENGED	# OVERRIDE	OVERRIDE RATE
Blank	330	17.0	159	48.2
A	158	8.1	62	39.2
E	196	10.1	82	41.8
F	304	15.7	253	83.2
Z	112	5.8	67	59.8
7	194	10.0	79	40.7
All Other	648	33.3	256	39.5
Totals	1,942	100.0	958	49.3

*Type Activity/Weapon System Code 'A' represents all planes, squadrons, and support echelons; 'E' represents all combatant ships (CAs, CCs, CGs, CLs, CVs, DDs, DEs, DLs, LPHs); 'F' represents the FBM (Fleet Ballistic Missile) Program; 'Z' and '7' represent special projects.

Airlift requests with a 'F' in the first position of the project code are more likely to override the challenge -- 83% of the time -- than any other type request. The remaining non-F project codes have override rates of 60% or less.

An examination of the distribution of challenged TACs reveals 156 different TACs with 67% (104 of 156) experiencing five or less challenges. Only five of the TACs had an impact larger than 5% of the challenges; N102, 5.35%; N186, 5.71%; N187, 8.74%; N189, 5.66%; and N908, 5.61%. Similar to the consignee and project code findings, TACs divide the challenges into too many parts each of which is too small to determine any significant relationship for challenges as a whole. Therefore, TACs provide no insight into the override decision. Considering only the first character of the TAC proved unproductive since 95% of the challenged TACs begin with an 'N'. A further attempt to consolidate TACs is to compare SDT TACs and non-SDT TACs as shown in TABLE VI. Since there is no

TABLE VI

SDT VS NON-SDT

	# CHALLENGED	% CHALLENGED	# OVERRIDE	% OVERRIDE
SDT	1,545	79.6	758	49.1
Non-SDT	397	20.4	200	50.4
Totals	1,942	100.0	958	49.3

significant difference between the override rates of SDT and non-SDT, knowing whether a request is SDT or not provides no

new insight into the prediction of the override rate.

Four different DICs were responsible for all the challenged airlift requests as revealed in TABLE VII. The DIC TX1 accounts for 92.6% of the challenged DICs and has an override rate of 48.7% which is practically the same as the overall average rate. Therefore, using the DIC to forecast challenge overrides is no better than merely using the overall average.

TABLE VII

COMPARISON OF DICs

DIC	# CHALLENGED	% CHALLENGED	# OVERRIDE	% OVERRIDE RATE
TE1	15	.8	11	73.3
TH1	1	.1	1	100.0
TJ1	127	6.5	70	55.1
TX1	1,799	92.6	876	48.7
Totals	1,942	100.0	958	49.3

The final airlift request characteristic analyzed is the challenge parameter which caused the challenge -- either the cube, weight, or days old -- alone or in combination. TABLE VIII shows almost half (48.1%) of the challenges are due to the days old parameter (90 days) alone and the override rate for this category is significantly higher than any of the other possibilities. Requests challenged due to their

weight, cube, or both experience override rates between 30% and 40%.

Combining the requests challenged due to their weight and/or cube yields an overall rate of 35% (as shown in TABLE IX). Similarly, requests challenged due to weight and/or cube in conjunction with days old experience an override rate between

TABLE VIII

COMPARISON OF CHALLENGE PARAMETERS

PARAMETER	# CHALLENGED	% CHALLENGED	# OVERRIDE	OVERRIDE RATE
Weight alone	327	16.9	100	30.6
Cube alone	122	6.3	49	40.2
Weight and Cube	383	19.7	145	37.9
Days old alone	935	48.1	586	62.7
Days old and weight	57	2.9	24	42.1
Days old and cube	32	1.6	14	43.8
Days old, weight, and cube	86	4.5	40	46.5
Totals	1,942	100.0	958	49.3

42% and 46% (TABLE VIII). The overall override rate for requests challenged due to both the ASW and days old is

approximately 45% (as shown in TABLE IX). Since relatively few requests are challenged due to both parameters and the override rate is close to the ASW override rate, all challenges other than days old alone were consolidated as shown in TABLE X.

TABLE IX

COMPARISON OF CHALLENGE PARAMETERS

PARAMETER	# CHALLENGED	% CHALLENGED	# OVERRIDE	OVERRIDE RATE
ASW	832	42.9	294	35.3
Days old	935	48.1	586	62.7
Both	175	9.0	78	44.6
Total	1,942	100.0	958	49.3

TABLE X

COMPARISON OF CHALLENGE PARAMETERS

PARAMETER	# CHALLENGED	% CHALLENGED	# OVERRIDE	OVERRIDE RATE
Days old alone	935	48.1	586	62.7
Others	1,007	51.9	372	36.9
Totals	1,942	100.0	958	49.3

The preceding analysis has shown the following characteristics have little or no impact on the override decision: consignee, project code (both the three digit code and first characters alone), TAC (both the four digit code and SDT

breakout) and the DIC. The challenge parameter, TP, the service code, and the APOD all impact on the override decision in varying degrees. The following section determines which of these characteristics used either singularly or in some combination can best predict whether a challenged request goes by air or not.

2. Selection of Best Override Estimator. The preceding section has shown that the challenge parameter, TP, service code, and APOD all impact on the override decision. This section determines which of these characteristics, used either singularly or in some combination, can best predict which challenged requests go by air:

a. The overall average override rate of 49%.

b. The service code alone.

Service Code	Override Rate
N	41%
R	39%
V	71%
Others	62%

c. The transportation priority alone.

TP	Override Rate
1	65%
Others	45%

d. The challenge parameter alone.

Parameter	Override Rate
Days old alone	63%
Others	37%

e. The service code in conjunction with the transportation priority.

Service Code	TP	Override Rate
N	1	64%
N	Others	32%
R	1	48%
R	Others	37%
V	1	85%
V	Others	69%
Others	1	88%
Others	Others	50%

f. The service code in conjunction with the challenge parameter.

Service Code	Parameter	Override Rate
N	Days old alone	46%
N	Others	38%
R	Days old alone	52%
R	Others	26%
V	Days old alone	90%
V	Others	40%
Others	Days old alone	40%
Others	Others	75%

g. The transportation priority in conjunction with challenge parameter.

TP	Parameter	Override Rate
1	Days old alone	62%
1	Others	68%
Others	Days old alone	63%
Others	Others	28%

h. All three: service code, transportation priority, and challenge parameter.

Service Code	TP	Parameter	Override Rate
N	1	Days old alone	59%
N	1	Others	68%
N	Others	Days old alone	38%
N	Others	Others	28%
R	1	Days old alone	42%
R	1	Others	57%
R	Others	Days old alone	56%
R	Others	Others	19%
V	1	Days old alone	95%
V	1	Others	67%
V	Others	Days old alone	90%
V	Others	Others	37%
Others	1	Days old alone	67%
Others	1	Others	100%
Others	Others	Days old alone	29%
Others	Others	Others	64%

The eight rules described above were tested on the April universe of challenged airlift requests. The requests were partitioned into eight groups representing the seven APODs with the greatest volume and a final category of all remaining APODs. TABLE XI compares the results of testing each of the proposed rules with the actual number of challenge overrides. For example, APOD PIK had 156 shipments challenged and 135 of these overridden. Under rule a, the average challenge rate of 49% is applied to PIK and results in a forecast of 76 overrides -- a discrepancy of 59 units (135 minus 76). Rule f, the service code in conjunction with the challenge parameter, forecasts 125 overrides -- a better estimate than rule a. In the aggregate, each of the rules forecasts overrides within 1% of the total experienced (958). However, none of the rules

TABLE XI

COMPARISON OF OVERRIDES GENERATED UNDER PROPOSED RULES

		ESTIMATED NUMBER OF OVERRIDES UNDER RULE							
APOD*	ACTUAL # OVERRIDES	a OVERALL AVG	b SERVICE CODE	c TP	d CHALLENGE PARAMETER	e SERV. CODE TP	f SERV. CODE CHALLEN. PAR.	g TP CHALLENGE PAR.	h ALL 3
PIK	135	76	109	70	90	107	125	89	125
RTA	137	121	149	117	128	144	150	123	151
NAP	95	85	117	87	86	121	104	83	107
HIK	57	108	91	109	98	89	88	95	84
UAM	118	99	84	97	102	82	89	102	89
CUA	77	124	102	130	117	112	99	121	104
OKO	90	96	79	98	94	82	80	92	80
OTHERS	249	242	223	248	238	222	221	243	221
TOTAL	958	951	954	956	953	959	956	948	961

*See APPENDIX D for definitions

consistently duplicate the number of overrides at each APOD.

To determine which method was the best overall, the rules were ranked within each APOD as shown in TABLE XII; e.g., the rule with the predicted number of overrides closest to the actual is ranked 1. For example, for APOD PIK, rules f and h produced the best estimate of the actual overrides -- 125 vice 135. Thus, these two rules tied for first place. Rather than assign each method a ranking of "1", first place and second place were averaged to arrive at a relative ranking weight of "1.5". The third best estimator for PIK was rule b, which received a weight of "3". This ranking procedure was applied to all the data by APOD. A comparison of the total ranking revealed that the challenge parameter (rule d) yielded the best method to forecast overrides, since it had the lowest ranking total of 29.

To ensure that the results of the ranking were not obtained by better rankings in the lower volume channels, the rankings were weighted by the number of challenged airlift requests at each APOD in TABLE XIII. Weighting the rankings does not change the previous result; using the challenge parameters to predict the number of overrides is the best method tested.

3. Sensitivity Analysis.

a. Parameter Values. The preceding analysis showed that the best estimator of overrides (rule d) is obtained by

TABLE XII

RANKING OF OVERRIDE ESTIMATOR RULES

APOD*	a OVERALL AVG	b SERVICE CODE	c TP	d CHALLENGE PARAMETER	e SERVICE CODE TP	f SERV. CODE CHALLEN. PAR.	g TP CHALLEN. PAR.	h ALL 3
PIK	7	3	8	5	4	1.5	6	1.5
RTA	7	3	8	2	1	4	5.5	5.5
NAP	4	7	1	2.5	8	2.5	5.5	5.5
HIK	7	4	8	6	3	2	5	1
UAM	3	7	4	1.5	8	5.5	1.5	5.5
CUA	7	2	8	5	4	1	6	3
OKO	3	8	4.5	2	4.5	6.5	1	6.5
OTHERS	3	5	1	4	6	7.5	2	7.5
TOTAL	41	39	42.5	29	38.5	30.5	32.5	36.5

*See APPENDIX D for definitions.

TABLE XIII

WEIGHTED RANKING OF OVERRIDE ESTIMATOR RULES

APOD*	NO. CHALLENGES	a OVERALL AVG	b SERVICE CODE	c TP	d CHALLENGE PARAMETER	e SERV. CODE TP	f SERV. CODE CHALLENGE PAR.	g TP CHALLENGE PAR.	h ALL 3
PIK	156	1,092	468	1,248	780	624	234	936	234
RTA	247	1,729	741	1,976	494	247	988	1,359	1,359
NAP	174	696	1,218	174	435	1,392	435	957	957
HIK	220	1,540	880	1,760	1,320	660	440	1,100	220
UAM	203	609	1,421	812	305	1,624	1,117	305	1,117
CUA	254	1,778	508	2,032	1,270	1,016	254	1,524	762
OKO	195	585	1,560	878	390	878	1,268	195	1,268
OTHERS	493	1,479	2,465	493	1,972	2,958	3,698	986	3,698
TOTAL	1,942	9,508	9,261	9,373	6,966	9,399	8,434	7,362	9,615

*See APPENDIX D for definitions.

using the parameter which caused the challenge; i.e., either days old alone or ASW with or without days old. This conclusion is based on the present universe of challenges determined by the current standard parameters. The following analysis attempts to answer the question: "If the parameter values change, thereby changing the number of challenged airlift requests, would the overrides continue to occur at the current rate?" In short, is the override rate sensitive to parameter changes?

FIGURE II shows the percentage of airlift challenges overridden for time intervals above the current challenge value of 90 days. While the override rate fluctuates around the average (the dotted line), no trend is apparent. Thus, challenges tend to be overridden at a uniform rate whether the requisition is 180 or 480 days old. Similarly, FIGURE III reveals no trends for the ASW parameter. Challenged material tends to be sent by air at the same override rate, irrespective of the magnitude of ASW or days old. Since FIGURES II and III indicate challenged material is <u>not</u> airlifted at a correspondingly smaller rate relative to the challenge parameters, the same override rate can be used for any value of the standard challenge parameters.

OVERRIDE RATE FOR DAYS OLD PARAMETER

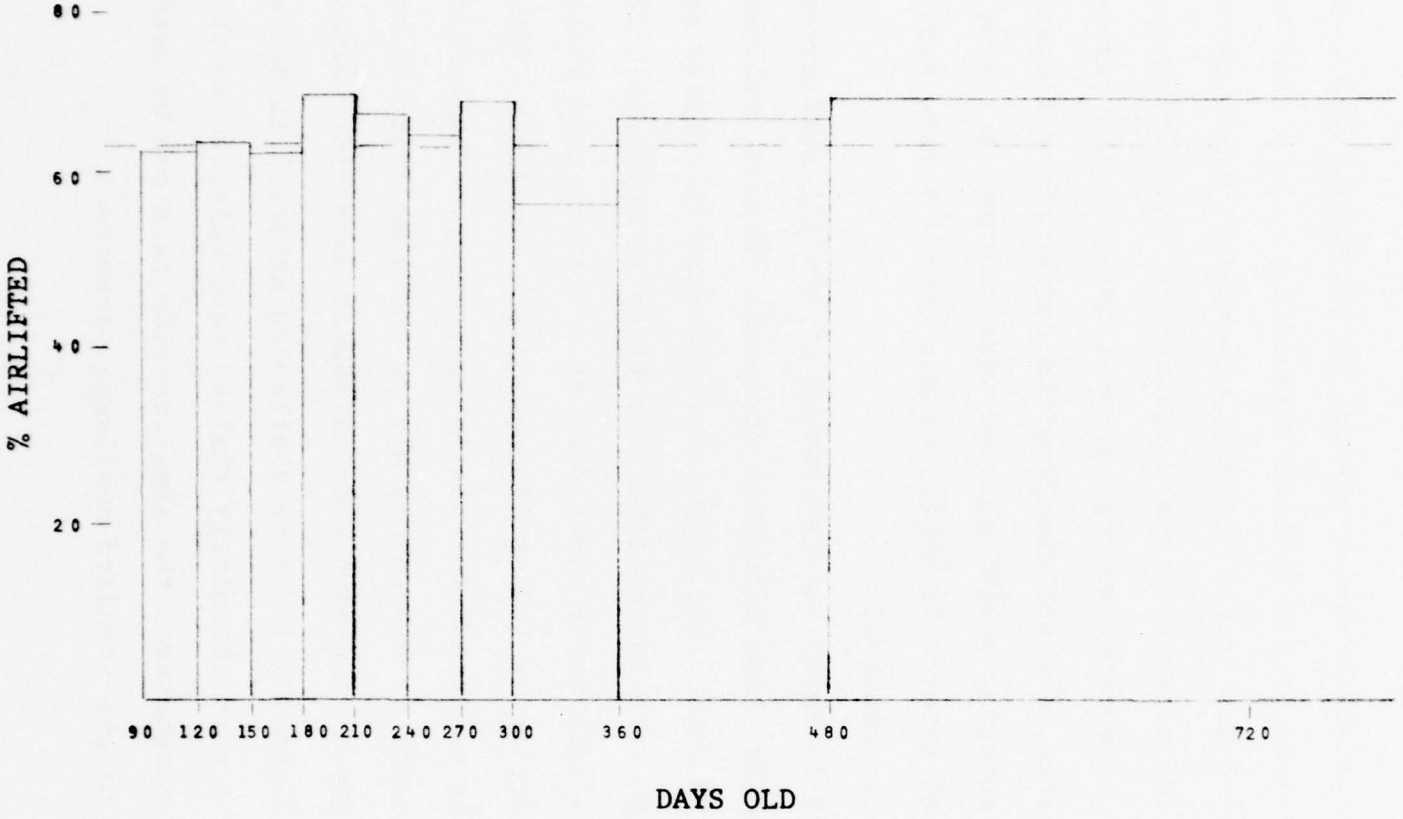

FIGURE II

OVERRIDE RATE FOR ASW PARAMETER

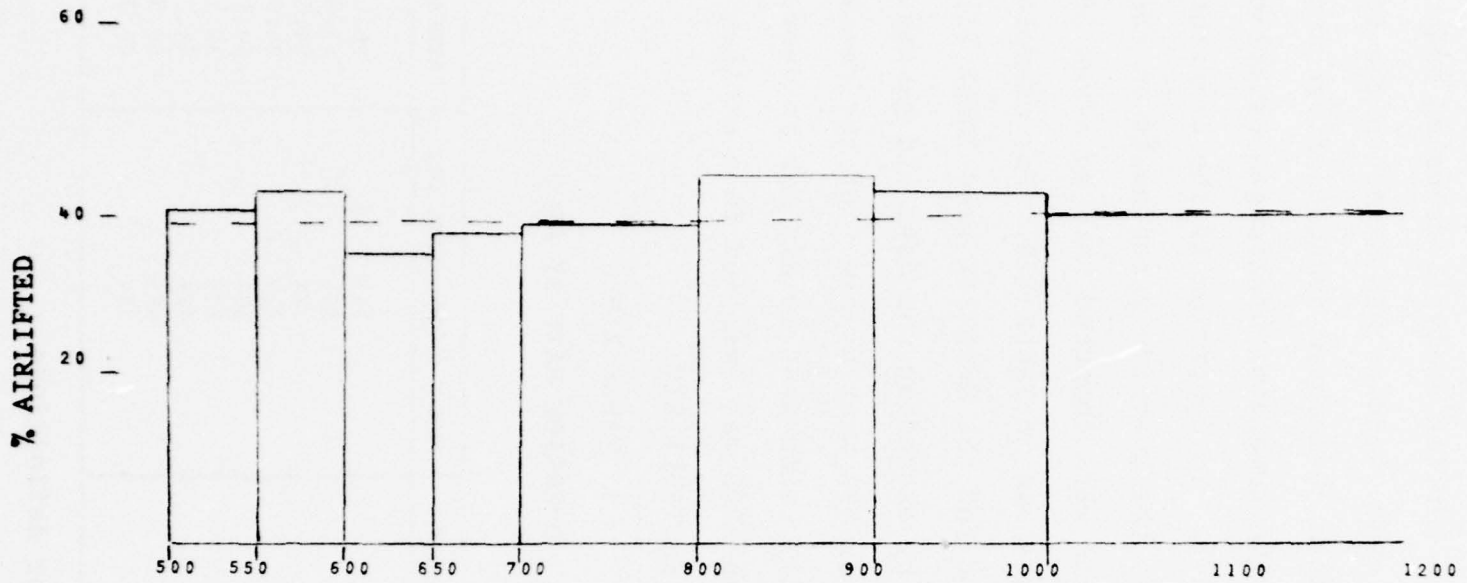

FIGURE III

b. APODs. Earlier analysis revealed that the best estimator of challenge override was based on the requisition age or ASW. Requests challenged because of age went by air 63% of the time while the remaining challenges experienced an override rate of 37%. To determine if the override rate varied among APODs, the override rates based on the exceeded challenge parameters were computed for the seven APODs with the most challenges as shown in TABLE XIV. For example, 156 challenges were recorded for the APOD PIK (see TABLE II). The challenges caused by exceeding the days old parameter numbered 127, of which 126 or 99% went by air. Of the remaining 29 challenges (156-127), nine went by air for an override rate of 31%. Thus, each APOD was examined in a similar fashion to derive the values in TABLE XIV.

TABLE XIV

OVERRIDE RATE BY APOD

APOD*	DAYS OLD ALONE	ASW W OR W/O DAYS OLD	AVERAGE
PIK	99%	31%	86.5
RTA	74%	30%	55.5
NAP	73%	36%	54.6
HIK	31%	22%	25.9
UAM	76%	38%	58.1
CUA	34%	27%	30.3
OKO	51%	42%	46.2
OTHERS	55%	49%	50.5
AVERAGE	63%	37%	49.3

*See APPENDIX D for definitions.

The override rates, based on the challenge parameter exceeded, vary considerably among APODs, especially for the days old parameter. Therefore, the override rates by APOD shown in TABLE XIV are better estimators than the overall average.

c. Time. The 30 day sample of airlift requests for May was used to compute override rates for all of the request characteristics discussed under the first section of the findings. These percentages were very similar and suggest that the override rate is independent of time. To illustrate this conclusion, TABLE XV compares the override rates by APOD for April, May and as an average (weighted by monthly volume). The weighted average override rates eliminate minor monthly fluctuations in a few APOD override rates. Therefore, the Airlift Clearance Analyzer forecasts which challenged requests are airlifted by using the average APOD override rates (the right column of TABLE XV).

TABLE XV

COMPARISON OF APRIL VS MAY OVERRIDE RATES

APOD*	CHALLENGE PARAMETER	OVERRIDE RATE		
		APRIL	MAY	AVERAGE
PIK	Days old alone	99%	99%	99%
PIK	Others	31%	38%	35%
RTA	Days old alone	74%	76%	75%
RTA	Others	30%	27%	28%
NAP	Days old alone	73%	64%	68%
NAP	Others	36%	41%	39%
HIK	Days old alone	31%	33%	32%
HIK	Others	22%	18%	21%
UAM	Days old alone	76%	70%	74%
UAM	Others	38%	36%	36%
CUA	Days old alone	34%	24%	29%
CUA	Others	27%	24%	26%
OKO	Days old alone	51%	40%	46%
OKO	Others	42%	41%	42%
OTHERS	Days old alone	55%	46%	50%
OTHERS	Others	49%	53%	50%
AVERAGE	Days old alone	63%	54%	59%
AVERAGE	Others	37%	38%	37%

*See APPENDIX D for definitions.

B. SENSITIVITY OF AIRLIFT CLEARANCE TO PARAMETER MODIFICATION. Using the override rates developed in TABLE XV, the Airlift Clearance Analyzer was used twice to process two months of data,

April and May. Typical results are shown in APPENDIX C. The total number of requests considered during April was 13,952. APPENDIX C reveals that 3,408 of the April requests are either prevalidated or automatic air shipments and have an air shipment cost of $1,544,380. If the remaining 10,544 requests were diverted, their surface shipment cost would be $241,298 and the total transportation cost would be $1,785,678.

The statistics for air shipments in the matrices of APPENDIX C include nonexempt airlift requests which are either (1) smaller than the given challenge parameters and go by air without challenge or (2) challenged because larger than the challenge parameters but forecasted to override the challenge and go by air. Since the matrices deal only with the airlift requests which are not prevalidated or not automatic; (i.e., requests subject to the challenge criteria), the prevalidated/automatic statistics; (i.e., requests exempt from challenge), must be added to the matrix values to obtain the total impact of changes to the challenge parameters. For example, in TABLE I of APPENDIX C the cell formed at the intersection of the 90 day column and 500 ASW row (today's challenge criteria) reveals 9,199 air shipments at a cost slightly over $1.2 million. The difference between 10,544 (total nonexempt air shipments obtained from lower right cell for the no limit parameter values) and 9,199 or 1,345 requests would go surface

at a cost of $105,381. The total impact of the 90 days old and 500 ASW challenge parameters would then be 12,607 air shipments (3,408 prevalidated/automatic and 9,199 at parameter values) at a cost of almost $2.8 million. The matrix values for surface costs remain valid.

Again, from APPENDIX C, TABLE I shows that 9,892 of the requests subjected to challenge would be airlifted at a cost of $1.44 million dollars for the parameter values of 1,000 ASW and 180 days (the parameter values in force prior to revision of the instruction). The current parameter values reduce the air shipments of nonexempt requests by 693 or 7.0% and the cost by about .2 million or 14.1%.

TABLE II in APPENDIX C provides similar statistics for May on a slightly smaller scale since 1,254 fewer requests were submitted to NAVMTO. Although the April and May matrices differ in absolute terms (due to smaller number of airlift requests), the relative differences between parameter values appear the same. For example, under the previous parameter values, 1,000 ASW and 180 days, 8,735 nonexempt requests go by air at a cost of $1.2 million. The current parameter values reduce these totals to 8,104 and just over one million dollars. The May reductions of 7.2% of the items and 14.6% of the air cost are not significantly different from the April values discussed above.

To better illustrate the sensitivity of the challenge parameters, TABLE XVI was developed and shows the percentage of total nonexempt air shipments which would go by airlift for selected parameter values. The percentages are based on the total possible air shipments; i.e., the number of shipments which would go by air if there were no limits on the challenge parameters and all eligible airlift requests were airlifted. TABLE XVI shows that under the current standard challenge values of 90 days old and 500 ASW, 87.2% of all nonexempt requests are airlifted. For example, suppose a given month's number of nonexempt airlift requests was expected to total 10,000. Under the current standard challenge parameter values, the airlift clearance analyzer would predict that 8,720 of these nonexempt airlift requests would be airlifted. In addition, TABLE XVI indicates other possible parameter values which forecast a similar number of air shipments. The combination of 400 ASW, 150 days old gives 8,710 shipments; and 600 ASW, 70 days old yields 8,700 shipments. (In terms of the number of requests airlifted, the standard challenge parameters are insensitive to small changes such as five in the days old and 25 in the air shipment weight.)

Since all percentages relate to the total nonexempt airlift requests received, the percentages cannot be compared directly to compute savings. For example, the preceding discussion

showed that the present challenge parameter values reduced the number of requests airlifted by 7% over the former parameter values (April data). TABLE XIV would appear to show the reduction as 6.6%, the difference between 93.8% (180 days old, 1,000 ASW - old parameter values) and 87.2% (90 days old, 500 ASW - new parameter values). TABLE XVI shows the reduction as 6.6 percentage points not 6.6%. The current percent change from any given set of parameter values to another can be obtained by dividing the difference in percentage points by the original percentage. Thus, the change in standard challenge parameter values did not reduce air shipments by 6.6%, but by 6.6% ÷ 93.8% or 7.0% as noted previously.

Similar to TABLE XVI, TABLE XVII illustrates how changes in the standard parameter values affect the air shipment cost of nonexempt airlift requests. Under the current standard parameter values, 53.6% of the total possible cost is incurred. To achieve the same results with an ASW of 400, the days old parameter would have to be eliminated and with an ASW of 600 the days old parameter should be approximately 40 (53.4%). In terms of the cost for the airlifted material, the standard challenge parameters are insensitive to small changes as shown in APPENDIX C.

To determine the true impact of parameter modification on the total cost of air shipments requires consideration

TABLE XVI

PERCENTAGE OF NONEXEMPT REQUESTS AIRLIFTED

ASW \ DAYS OLD	10	30	50	70	90	110	130	150	180	NO LIMIT
100	56.1	63.9	66.1	67.6	68.5	69.1	69.3	69.6	69.9	71.0
200	61.1	71.6	74.6	76.6	77.8	78.6	79.0	79.3	79.7	81.2
300	63.6	75.3	78.7	81.0	82.4	83.2	83.7	84.1	84.6	86.4
400	65.2	77.8	81.3	83.8	85.3	86.2	86.7	87.1	87.6	89.5
500	66.4	79.4	83.1	85.7	87.2	88.2	88.8	89.2	89.7	91.7
600	67.0	80.6	84.4	87.0	88.7	89.7	90.3	90.7	91.3	93.3
700	67.5	81.3	85.2	87.8	89.4	90.4	91.0	91.5	92.1	94.2
800	67.8	81.8	85.8	88.4	90.1	91.1	91.7	92.2	92.8	95.0
900	68.0	82.1	86.2	88.9	90.6	91.7	92.3	92.8	93.4	95.6
1000	68.2	82.5	86.5	89.3	91.0	92.1	92.7	93.2	93.8	96.0
3000	69.4	84.4	88.8	91.7	93.5	94.6	95.3	95.8	96.6	98.9
5000	69.7	84.9	89.2	92.1	94.0	95.1	95.8	96.3	97.1	99.4
NO LIMIT	69.9	85.2	89.6	92.6	94.4	95.6	96.3	96.9	97.6	100.0

of all airlift requests received by NAVMTO. TABLE XVII shows that the cost of airlifted nonexempt air shipments, (i.e., requests subjected to the challenge criteria), is relatively insensitive to parameter modification. When all airlift requests are included in the analysis -- both requests exempt

TABLE XVII

PERCENTAGE OF AIR SHIPMENT COST FOR NONEXEMPT REQUESTS

ASW \ DAYS OLD	10	30	50	70	90	110	130	150	180	NO LIMIT
100	39.9	40.8	41.1	41.3	41.4	41.4	41.5	41.5	41.5	41.7
200	41.8	43.8	44.4	44.8	45.0	45.2	45.3	45.3	45.4	45.7
300	43.4	46.4	47.2	47.8	48.1	48.4	48.6	48.7	48.8	49.3
400	44.9	48.7	49.7	50.5	50.9	51.2	51.4	51.5	51.7	52.3
500	46.5	50.9	52.1	53.0	53.6	53.9	54.1	54.3	54.5	55.3
600	47.5	52.7	54.1	55.1	55.7	56.2	56.5	56.6	56.9	57.8
700	48.3	54.1	55.5	56.7	57.3	57.8	58.0	58.2	58.5	59.6
800	49.0	55.2	56.7	57.9	58.6	59.1	59.4	59.6	60.0	61.0
900	49.4	56.0	57.6	59.0	59.8	60.4	60.8	60.9	61.3	62.5
1000	49.9	56.7	58.5	60.0	60.8	61.3	61.7	61.9	62.3	63.6
3000	54.8	65.4	68.1	70.2	71.6	72.6	73.2	73.7	74.3	75.9
5000	56.9	69.0	71.8	74.1	75.5	76.7	77.4	77.9	78.9	80.6
NO LIMIT	66.0	81.2	85.6	90.4	92.5	94.2	95.0	95.6	96.9	100.0

from challenge, (i.e., prevalidated/automatic), and requests subjected to the challenge criteria, the total cost of airlifted shipments is virtually unaffected by parameter modification as illustrated in TABLE XVIII. Since the cost of airlifting

all requests exempt from challenge is more than $1.5 million and the cost of airlifting all remaining requests is $2.3 million (for April - see APPENDIX C), much of the airlift cost is tied to requests exempt from challenge and it is understandable that the total cost of airlifted shipments is relatively unaffected by parameter modifications.

TABLE XVIII

PERCENTAGE COST OF AIRLIFT FOR ALL AIR SHIPMENTS REQUESTS

ASW \ DAYS OLD	30	50	70	90	110	130	150
200	66.3	66.7	66.9	67.0	67.1	67.2	67.5
300	67.9	68.6	68.7	68.9	69.0	69.2	69.2
400	69.2	69.8	70.3	70.6	70.7	70.9	70.9
500	70.6	71.3	71.8	72.2	72.4	72.5	72.6
600	71.6	72.7	73.1	73.5	73.7	73.9	74.0
700	72.5	73.3	74.0	74.4	74.7	74.8	74.9
800	73.1	74.1	74.8	75.2	75.5	75.7	75.8

The percentages in TABLE XVIII reflect the portion of the total possible air cost, (i.e., if all air eligible cargo was shipped by air), which would be incurred under these possible parameter values. Holding the ASW challenge parameter constant and varying the days old parameter by as much as 120 days

produces a difference of approximately two percentage points. However, the ASW parameter has a greater impact on the cost. Changing the ASW parameter by 600, while holding the days old parameter constant, generates a difference of about eight percentage points.

TABLE XVIII dealt with all airlift requests received by NAVMTO. Approximately 80% of each months airlift requests were for shipments with SDT TAC codes. By only considering SDT airlift requests, TABLE XIX shows the impact of parameter changes on SDT funds. Each percentage in TABLE XIX reflects the portion of the total possible SDT air cost,(i.e., if all SDT air eligible cargo - whether exempt from challenge or not - was shipped by air). The relative differences in the impact of the challenge parameters on SDT funds is approximately the same as previously discussed for all requests.

TABLE XIX

PERCENTAGE COST OF AIRLIFT FOR ALL SDT AIR REQUESTS

ASW \ DAYS OLD	30	50	70	90	110	130	150
200	61.4	61.8	62.1	62.2	62.3	62.4	62.5
300	63.4	64.0	64.4	64.6	64.8	64.9	65.0
400	65.1	65.8	66.4	66.7	66.8	67.0	67.1
500	66.5	67.4	68.0	68.4	68.6	68.7	68.8
600	67.7	68.8	69.5	70.0	70.2	70.5	70.5
700	68.7	69.9	70.6	71.1	71.4	71.6	71.7
800	69.3	70.6	71.4	71.9	72.2	72.5	72.6

IV. SUMMARY AND CONCLUSIONS

The Airlift Clearance Analyzer was developed to forecast the economic and operational effects of modifying the standard challenge parameters. The analyzer recognizes prevalidated and automatic air shipments and separately calculates the cost of air shipment for these requests exempt from the standard challenge criteria. The remaining nonexempt air shipments are subject to various possible parameter values. If the request does not exceed the challenge parameters or is expected to override the challenge, the analyzer considers the request as an air shipment and computes the expected number, cumulative weight, and cost of air shipments. The analyzer also calculates the surface cost for the remaining requests.

A critical element needed to operate the analyzer is the capability to forecast air shipment overrides. The following characteristics of challenged requests were analyzed to estimate which requests override the challenge: channel, APOD, consignee, service code, transportation priority, project code, first character of the project code (the type activity or weapons system indicator), TAC, DIC, and the challenge parameter which caused the challenge. This analysis revealed the following:

. The characteristics which have a significant impact on

the override decision are transportation priority, service code, the APOD, and the parameter which caused the challenge.

. The best estimator of overrides employs the challenge parameter and the APOD.

. A constant override rate can be applied without regard to the challenge parameter values; (i.e., requests challenged because of age - whether 180 days old or 90 days old - experience the same override rate).

. The override rate does not vary from month-to-month.

. The override rate varies significantly from APOD to APOD among the APODs with a large number of challenges.

. The override rates developed for the analyzer are displayed below:

TABLE XX

OVERRIDE RATES (%)

CHALLENGE PARAMETER \ APOD*	PIK	RTA	NAP	HIK	UAM	CUA	OKO	OTHERS
Days old alone	99	75	68	32	74	29	46	50
Others	35	28	39	21	36	26	42	50

*See APPENDIX D for definitions

The sample air shipment data in conjunction with the forecasted override rates displayed above were processed through the Airlift Clearance Analyzer. Tables were constructed to display the monthly (April and May) material flow and movement costs for a range of reasonable parameter values.

A review of the analyzer output revealed the following:

. Although the volume of airlift requests varies by month, the relative differences among the monthly material flow and movement cost values appear constant.

. The number and cost of nonexempt air shipments are relatively insensitive to changes in the standard challenge parameters.

. A comparison of airlift requests coded SDT with all airlift requests revealed that the relative differences among the material flow and movement costs were constant.

In conclusion, the Airlift Clearance Analyzer provides a quantitative basis for projecting monthly number and cost of air shipments resulting from feasible challenge parameter settings. Tables were constructed to show the monthly material flow and movement costs for a range of reasonable parameter values based on a two month data base. Analyzer runs based on additional data can be made, as required. Thus, management now

has the proper tools for projecting and monitoring the most important parameters in the cost-effective operation of the air clearance process.

APPENDIX A: REFERENCES

1. NAVSUPINST 4630.22A, Use of Air Transportation by Navy Shippers dated 10 Feb 1976.

2. NAVSUP ltr 04A/RDS of 9 Sep 1976.

3. DOD REG 4500.32R (MILSTAMP), Vol. II.

4. AFR 76-11, Military Airlift U. S. Government Rate Tariff, Section 3, Paragraph 2A.

APPENDIX B: TYPE OF SHIPMENTS EXEMPT FROM CHALLENGE (AUTOMATIC)

1. The RDD (Required Delivery Date) equals 999 and the requisition date is less than 90 days.

2. The TCN denotes a CASREPT (Casualty Reporting System) or NORS (Not Operationally Ready, Supply) shipment (i.e., the 11th position of TCN equals W or G) and the requisition date is less than 90 days.

3. The DIC equals TF1 (unaccompanied baggage) and the commodity code is JZ (unaccompanied baggage no special handling).

4. The second position of the DIC equals C (Armed Forces Courier Service) or G (Mail from Postal Concentration Centers).

5. The DIC equals TH1 (household goods), the commodity code equals TZ (household goods no special handling) and the APOD equals -

ADD, Addis Ababa, Ethiopia
AMM, Amman, Jordan
ASP, Alice Springs, Australia
BAH, Bahrain, Arabian Gulf
CHC, Christchurch, New Zealand
LEA, Northwest Cape, Australia
LGS, Lajes, Azores

RCM, Richmond, Australia

THR, Teheran, Iran

UMR, Woomera, Australia

APPENDIX C: SAMPLE ANALYZER RESULTS

Analyzer results for selected challenge parameter values are shown in TABLES I and II for the months of April and May, respectively. For each cell in the matrix of TABLES I and II the first entry represents the projected number of air shipments for the given challenge parameters corresponding to the row and column. The number of air shipments represent airlift requests with weight, cube, and age lower than the challenge parameter values and those requests which, although challenged, are expected to go by air anyway. The second entry in the cell represents the cumulative ASW, i.e., the maximum of each request's weight or 12.5 times the volume, for all projected air shipments. The third entry is the cost of MAC airlift for the projected air shipments. The final entry is the cost of shipping all remaining airlift requests (the ones which do not override the challenge) by surface.

For example, the intersection of the 90 days column and the 500 ASW row in TABLE I yields the following information. Projected air shipments of 9,199. Total ASW and cost of the air shipments of 1,982,346 pounds and 1,238,437 dollars. The cost of sending the remaining 1,345 (10,544-9,199) shipments by surface is 105,381 dollars.

The transportation costs for air and surface shipments are based on the rate per channel pound used by NAVMTO in the air clearance process.

APRIL AIRLIFT REQUESTS

Number of Airlift Requests	13,952
Number of Prevalidated/Automatic Air Shipments	3,408
Cumulative ASW Prevalidated/Automatic Air Shipments	2,779,275
Cumulative Air Shipment Cost	$1,544,380
Cumulative Surface Cost for all Nonprevalidated/Nonautomatic	$ 241,298

TABLE I

NONEXEMPT - AIRLIFT REQUESTS

ASW \ DAYS OLD		10	50	90	120	180	NO LIMIT
100	*A	5,912	6,966	7,226	7,294	7,371	7,483
	B	1,481,246	1,524,533	1,534,822	1,537,553	1,540,803	1,545,929
	C	922,113	949,806	956,817	958,514	960,586	963,977
	D	136,720	133,994	133,326	133,151	132,946	132,633
300	A	6,704	8,294	8,686	8,801	8,923	9,110
	B	1,618,912	1,752,049	1,784,960	1,795,742	1,807,766	1,826,552
	C	1,003,997	1,090,569	1,113,226	1,120,113	1,128,019	1,140,446
	D	128,037	119,743	117,674	116,966	116,171	115,054
500	A	6,998	8,766	9,199	9,325	9,462	9,673
	B	1,732,986	1,933,833	1,982,346	1,997,661	2,015,442	2,043,977
	C	1,075,828	1,204,175	1,238,437	1,247,990	1,259,158	1,278,324
	D	120,896	108,419	105,381	104,374	103,132	101,410
1000	A	7,196	9,124	9,597	9,735	9,892	10,125
	B	1,866,809	2,175,258	2,252,024	2,275,212	2,306,275	2,350,048
	C	1,154,165	1,353,514	1,404,990	1,420,404	1,440,886	1,469,540
	D	112,476	93,421	88,813	87,215	85,159	82,525
NO LIMIT	A	7,368	9,450	9,958	10,113	10,293	10,544
	B	2,517,039	3,244,088	3,520,877	3,601,996	3,683,553	3,796,043
	C	1,524,926	1,978,825	2,138,987	2,185,861	2,239,399	2,312,133
	D	75,215	30,743	16,192	11,393	6,391	0

*A Number of projected air shipments
B Cumulative ASW of projected air shipments in A (in pounds)
C Cumulative costs of projected air shipments in A (in dollars)
D Cumulative costs of projected surface shipments (in dollars)

MAY AIRLIFT REQUESTS

Number of Airlift Requests	12,698
Number Prevalidated-Automatic Air Shipments	3,348
Cumulative ASW Prevalidated/Automatic Air Shipments	2,920,407
Cumulative Air Shipment Cost	$1,575,265
Cumulative Surface Cost for all Nonprevalidated/Nonautomatic	$ 213,472

TABLE II

NONEXEMPT - AIRLIFT REQUESTS

ASW \ DAYS OLD		10	50	90	120	180	NO LIMIT
100	*A	5,182	6,147	6,356	6,409	6,465	6,562
	B	1,337,065	1,376,835	1,385,767	1,387,974	1,390,432	1,394,730
	C	764,550	789,132	795,072	796,696	798,234	801,165
	D	126,818	124,247	123,698	123,554	123,395	123,134
300	A	5,899	7,387	7,697	7,799	7,900	8,057
	B	1,461,168	1,591,428	1,619,088	1,629,329	1,640,058	1,654,742
	C	838,324	921,863	941,010	948,604	955,788	964,918
	D	118,959	110,842	109,159	108,538	107,842	106,978
500	A	6,123	7,764	8,104	8,217	8,339	8,526
	B	1,549,326	1,737,101	1,776,390	1,791,195	1,809,878	1,836,345
	C	892,391	1,011,060	1,038,219	1,048,465	1,061,249	1,077,103
	D	113,309	101,589	99,145	98,233	97,054	95,482
1000	A	6,305	8,110	8,474	8,598	8,735	8,945
	B	1,670,885	1,969,517	2,026,259	2,048,227	2,077,143	2,120,458
	C	956,493	1,142,570	1,182,115	1,196,780	1,215,886	1,242,080
	D	105,955	87,683	84,251	82,887	81,052	78,503
NO LIMIT	A	6,477	8,427	8,815	8,958	9,115	9,350
	B	2,238,640	2,957,993	3,084,142	3,163,864	3,277,629	3,429,299
	C	1,285,442	1,739,452	1,809,191	1,864,959	1,922,521	2,005,781
	D	72,964	26,564	18,933	14,095	7,981	0

*A Number of projected air shipments
B Cumulative ASW of projected air shipments in A (in pounds)
C Cumulative costs of projected air shipments in A (in dollars)
D Cumulative costs of projected surface shipments (in dollars)

These tariffs are published in AFR 76-11 (air) and CO MSC Instruction 7600.3F (surface).

APPENDIX D: CHANNEL CODES

Channel Code	Channel Name
CUA	Cubi Point, Philippines
DNA	Okinawa, Japan
DOV	Dover, Delaware
GAO	Guantanamo, Cuba
HIK	Hickam, Hawaii
KEF	Keflavik, Iceland
NAP	Naples, Italy
NGU	Norfolk, Virginia
OKO	Yokota, Japan
PIK	Prestwick, Scotland
RTA	Rota, Spain
SBD	Norton, California
SIZ	Sigonella, Italy
SUU	Travis, California
TCM	McCord, Washington
UAM	Guam, Marianas

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13. ABSTRACT

To conserve SDT (Second Destination Transportation) funds, NAVSUP established new challenge parameter values for CONUS outbound cargo scheduled for lift by MAC. The modification of the challenge parameters changed the monthly material flow and movement costs. This report documents a quantitative model, the Airlift Clearance Analyzer, which compares the tradeoffs in material flow and movement costs resulting from changes to the airlift challenge parameter values. Tables were constructed to show the monthly percentages of shipments airlifted and costs of airlifted shipments. These tables provide a quantitative basis for projecting monthly number and cost of air shipments resulting from feasible parameter settings. The tables may be validated at any time through additional runs of the Airlift Clearance Analyzer.

1/B

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